

7-1 Practice**Operations on Functions**

Find $(f + g)(x)$, $(f - g)(x)$, $(f \cdot g)(x)$, and $\left(\frac{f}{g}\right)(x)$ for each $f(x)$ and $g(x)$.

1. $f(x) = 2x + 1$
 $g(x) = x - 3$

2. $f(x) = 8x^2$
 $g(x) = \frac{1}{x^2}$

3. $f(x) = x^2 + 7x + 12$
 $g(x) = x^2 - 9$

For each pair of functions, find $f \circ g$ and $g \circ f$, if they exist.

4. $f = \{(-9, -1), (-1, 0), (3, 4)\}$
 $g = \{(0, -9), (-1, 3), (4, -1)\}$

5. $f = \{(-4, 3), (0, -2), (1, -2)\}$
 $g = \{(-2, 0), (3, 1)\}$

6. $f = \{(-4, -5), (0, 3), (1, 6)\}$
 $g = \{(6, 1), (-5, 0), (3, -4)\}$

7. $f = \{(0, -3), (1, -3), (6, 8)\}$
 $g = \{(8, 2), (-3, 0), (-3, 1)\}$

Find $[g \circ h](x)$ and $[h \circ g](x)$, if they exist.

8. $g(x) = 3x$
 $h(x) = x - 4$

9. $g(x) = -8x$
 $h(x) = 2x + 3$

10. $g(x) = x + 6$
 $h(x) = 3x^2$

11. $g(x) = x + 3$
 $h(x) = 2x^2$

12. $g(x) = -2x$
 $h(x) = x^2 + 3x + 2$

13. $g(x) = x - 2$
 $h(x) = 3x^2 + 1$

If $f(x) = x^2$, $g(x) = 5x$, and $h(x) = x + 4$, find each value.

14. $f[g(1)]$

15. $g[h(-2)]$

16. $h[f(4)]$

17. $f[h(-9)]$

18. $h[g(-3)]$

19. $g[f(8)]$

20. BUSINESS The function $f(x) = 1000 - 0.01x^2$ models the manufacturing cost per item when x items are produced, and $g(x) = 150 - 0.001x^2$ models the service cost per item. Write a function $C(x)$ for the total manufacturing and service cost per item.

21. MEASUREMENT The formula $f = \frac{n}{12}$ converts inches n to feet f , and $m = \frac{f}{5280}$ converts feet to miles m . Write a composition of functions that converts inches to miles.